REMEDIAL INVESTIGATION
SCOPE OF WORK
FOR CORRECTIVE ACTION BEYOND THE FACILITY BOUNDARY
MIDLAND AREA SOILS

PURPOSE

Dow's Hazardous Waste Site Operating License ("License"), Condition XI.B.2., issued on June 12, 2002, requires Dow to submit to the Michigan Department of Environmental Quality ("MDEQ") for review and approval a Scope of Work ("SOW") for conducting a Remedial Investigation ("RI") for Midland Area Soils. The SOW outlines the general steps involved in the implementation of a RI, which will be elaborated upon in the RI Workplan that will be submitted to MDEQ for review and approval following approval of the SOW.

The License also requires Dow to propose Interim Remedial Activities and a Public Participation Plan along with the SOW.

The SOW is intended to be a preliminary outline that provides an overview of the contents of the RI Workplan that Dow will prepare after approval of the SOW by MDEQ.

The RI Workplan will be developed by Dow working with the MDEQ after Dow and MDEQ receive public input on the SOW. As it is developed, the RI Workplan may vary from the SOW in its organization, task, prioritization of activities, or other aspects, subject to MDEQ approval.

Outline of the SOW

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A. Area Background
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A Environmental Setting
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C. Characterization of Midland Area Soils
D. Prioritization and Identification of Locations for Further Sampling
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G. Ecological Risk Assessment
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TASK V: REPORTS

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TASK VI: PUBLIC PARTICIPATION PLAN

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PROPOSED SCHEDULE OF TASKS

SCHEDULE OF SUBMISSIONS

TASK I: INTERIM RESPONSE ACTIVITIES

Condition XI.B.3.(a) of the License requires Dow to propose to MDEQ immediate Interim Response Activities ("IRAs") based on existing data. Following MDEQ approval of an IRA, Dow will submit an IRA Workplan for review and approval as provided for in Condition XI.G.

IRA Workplans will be prepared for review and approval by the MDEQ, and will include the following:

- A description of the objectives of the response activity and how they will be achieved;
- A legal description of the specific parcel of property addressed by the interim response activity;
- A detailed description of the response activity to be undertaken, including all data that are relevant to the conclusions drawn;
- A schedule for implementation of the proposed activity.

IRAs are immediate actions based on available data that may not be final remedial actions and are activities undertaken to address potential human exposure pathways. The IRAs identified below will be implemented in advance of the RI.

As requested by MDEQ, and without admission by Dow as to the need for the such measures, the following constitute the immediate IRAs to be undertaken by Dow:

A. Establish a Community Information Center

1. The Community Information Center will provide information that will assist residents with actions that they can take to reduce their potential for exposure, as appropriate;

2. The setup and the contents of the information center will be developed based on community input; and

3. The information will include an explanation of the RI process as well as information about the RI itself, will be updated during the course of the RI.

B. Develop public information materials

1. The public information materials will be made available through the Community Information Center to assist residents with actions that they can take to reduce their potential for exposure; and

2. The information materials will cover topics of interest to residents (e.g. dust mitigation, handling of home, grown vegetables, etc.) and be developed for different segments of the community (e.g. educational information for schools, information for homeowners, for contractors, etc).

TASK II: DESCRIPTION OF CURRENT CONDITIONS

Dow will submit for MDEQ approval a report providing background information pertinent to Midland Area Soils. This report will include information gathered during previous investigations, including Dow generated data, as well as other relevant data, which would help to characterize the current conditions in Midland Area Soils. The Current Condition report will summarize the regional location, pertinent boundary features, general physiography, topography and current land use for the Midland Area Soils.

A. Area Background

The Current Conditions report will include available map(s) that will depict the following available information:

1. General geographic location;

2. Property lines delineated, with the owners of property identified for study areas;

3. Topography, drainage patterns, buildings, pavement, vegetation; and

4. Color coding indicating the Michigan land use categories of property in the study area.

B. Summary of Existing Data

The Current Conditions report will describe the existing information on the presence of dioxins and furans (the "chemicals of concern") in Midland Area Soils.

1. Available monitoring data and qualitative information on locations and levels of chemicals of concern in Midland Area Soils; and

2. A preliminary description of the geology, soils, physiography, and meteorology for Midland Areas Soils.

C. Definition of Data Gaps

The Current Conditions Report will address the following:

1. Identification of the portions of the Midland Area Soils where additional information is necessary; and

2. Identification of the type of additional information necessary to characterization the nature and extent of chemicals of concern in the study area:

    a. Identification and explanation of what media requires more information in particular segments of the study area:

    b. Identification and explanation of what additional media does not require further sampling in study area:

    c. Identification and explanation of the nature of necessary additional sampling; and

    d. Identification and explanation of particular events and conditions that require further sampling (e.g. storm and flooding events, seasonal changes, etc.)

TASK III: RI WORKPLAN REQUIREMENTS

Following approval of the SOW, Dow will prepare a RI Workplan for the Midland Area Soils. This RI Workplan will include several components described below. During the implementation of the RI, the RI Workplan may be revised with the approval of the MDEQ to meet changing or unforeseen conditions. The RI Workplan will include the following:

A. Project Management Plan

The RI Workplan will include a Project Management Plan which will include a discussion of the technical approach, schedules, and personnel for conducting the RI. The Project Management Plan will also include:

1. A description of qualifications of the personnel performing or directing the RI, including contractor personnel; and

2. The overall management approach to the RI.

B. Data Collection Quality Assurance Project Plan

The RI Workplan will include a plan to document all monitoring procedures, sampling procedures, field measurements, and sample analysis performed during the investigation to characterize the environmental setting. The Data Collection Strategy section of the Data Collection Quality Assurance Project Plan will include the following:

1. Description of the intended uses for the data and of the necessary level of precision and accuracy for these intended uses;

2. Description of methods and procedures to be used; and

3. Description of the rationale used to assure that the data accurately represent a characteristic of a population, or an environmental condition. Examples of factors which will be considered and discussed include:

    a. Environmental conditions at the time of sampling;

    b. Number of sampling points;

    c. Representativeness of selected media; and

    d. Representativeness of selected analytical parameters.

C. Data Management Plan

The RI Workplan will include a Data Management Plan to document and track investigation data and results. This Plan will identify and set up data documentation materials and procedures.

TASK IV: REMEDIAL INVESTIGATION

The purpose of a Remedial Investigation ("RI") is to assess conditions in order to select an appropriate remedial action, if one is required, that adequately addresses those conditions. The RI defines the nature and extent of conditions in Midland Soils Area.

More specifically, the RI will involve a series of investigations necessary to: describe in detail the current Midland Area Soils conditions (Environmental Setting); evaluate the potential existence of continuing sources of chemicals of concerns associated with Dow's Midland facility (Potential Continuing Source Characterization); define the degree and extent of the presence of chemicals of concerns in the Midland Area Soils (Characterization of the Midland Area Soils); identify current and reasonably anticipated receptors in the Midland Area Soils (Current and Reasonably Anticipated Receptor Identification); and conduct a risk assessment on human health (Human Health Risk

Assessment) and ecological receptors (Ecological Risk Assessment). A summary and analysis of the data collected during the RI will be reported in the RI report.

A. Environmental Setting

The RI will collect information to supplement existing information on the environmental setting of the Midland Area Soils in order to characterize the following:

1. Soils. The RI will provide a general classification and description of the soils in the Midland Area Soils that will include:

    a. Surface soil distribution;

    b. Soil profile, including American Standard Test Method (ASTM) classification of soils;

    c. Transects of soil stratigraphy consistent with the depth of the impacted soil;

    d. Soil sorptive capacity;

    e. Cation exchange capacity;

    f. Soil organic content;

    g. Soil pH;

    h. Particle size distribution; and

    i. Mineral content.

2. Climate. Climate in the City of Midland will be characterized by the following:

    a. Annual and monthly rainfall averages;

    b. Monthly temperature averages and extremes;

    c. Wind speed and direction;

    d. Evaporation data; and

    e. Description of topographic and man-made features which affect airflow and emission patterns.

B. Evaluation of the Potential for Continuing Sources

The RI shall coordinate with the Soil Monitoring Program required by Condition X. L. of the License that will determine if there are any continuing sources of chemicals of concern from tracking out or blowing dust from Dow's Midland facility that impact the Midland Area Soils.

C. Characterization of Midland Area Soils

The RI shall collect analytical data on chemicals of concern, as appropriate, in the Midland Area Soils. These data shall be sufficient to define the concentrations of chemicals of concern in the study area.

1. Statistical Sampling of Midland Area Soils

    a. Based on the Data Gap analysis (Task II.C.), locations for sampling will be identified and sampling will be conducted of soils;

    b. A statistical sampling approach will be applied; and

    c. The approach chosen will result in a sampling plan that will characterize the concentration of chemicals of concern in the Midland Area soils.

2. Additional Sampling

    Additional sampling may be conducted depending on results of sampling and the analysis of sampling results.

D. Prioritization and Identification of Locations for Further Sampling:

The RI sampling work for Task IV.C. will be based on the an assessment of the existing data on the Midland Area Soils and an evaluation of the Data Gaps. A variety of evaluations will be performed on existing data to determine what additional data is required to be able to generate site-specific criteria as provided for in License Condition XI.B.3.b(iv) and to aid in the prioritization activities. The initial prioritization may change based on the conclusions that are drawn from data that is collected (iterative approach).

1. A phased approached to sampling will be designed for the areas north and east of the Dow facility that prior sampling and other evaluations have identified as most in need of further characterization with respect to the chemicals of concern.

2. The actual phasing of sampling and the precise location for sampling will be determined by an evaluation of the Data Gaps analysis subtask of the Current Condition Task.3. The timing of RI activities may be affected by the need to obtain permission for access to property, the requirement to obtain permits from governmental agencies, weather and other conditions which Dow cannot control.

E. Current and Reasonably Anticipated Receptor Identification

Human populations that come in contact with chemicals of concerns found in Midland Area Soils will be characterized. The following characteristics shall be identified:

1. Current and reasonably anticipated future human use of property including, but not limited to:

   a. Types of use and reasonably anticipated future uses (e.g. residential, commercial, zoning/deed restrictions); and

   b. Any current use restrictions relative to the Midland Area soils and the locations where significant chemicals of concern concentrations are present.

2. A demographic profile of the people who use or have access to the Midland Area Soils.

3. Studies to support to the evaluation of current and reasonably anticipated future receptors.

   a. A bioavailability study will be performed to determine what portion of chemicals of concern found in the Midland Area Soils are biologically available as determined by *in vivo* laboratory studies.

   b. A vegetable study will be conducted to determine the potential for uptake of chemicals of concerns in vegetables.

   c. An evaluation of potential inhalation exposure pathways will be conducted; and

   d. An evaluation of direct skin contact exposure will be conducted, to determine human absorption rates of chemicals of concern from Midland Area Soils.

F. Human Health Risk Assessment

Dow will conduct site-specific risk assessments for the Midland Area Soils utilizing all available data as well as data to be generated by the RI to develop site-specific criteria as provided for in License Condition XI.B.3.b(iv). This effort will include risk assessments based on site-specific exposure parameters coupled with probabilitistic (e.g. Monte Carlo) approaches. This risk assessment process is summarized in the following steps.

1. Exposure Assessment: As required in Condition XI B. 3.(b) of the license, Dow will evaluate critical chemicals of concern fate and transport processes (fate, mobility, and availability) in relation to the spatial and temporal distribution of chemicals of concerns in the Midland Area Soils. Exposure assessment includes information gathered from Task IV.A. D. along with an evaluation of all exposure pathways and their frequency relevant to Midland residents.

    a. The initial exposure pathways to be evaluated are listed in the Part 201 regulations.

    b. Additional exposure pathways will be identified and evaluated.

2. Toxicity Assessment/Hazard Identification: Toxicity assessment is equivalent to hazard identification.

3. Risk Characterization: The risk characterization will summarize and combine the output of the preceding steps by computing estimates of risk. Risk estimates will be presented in terms of a theoretical cancer risk (i.e., one in one hundred thousand), a hazard quotient for non-cancer endpoints (i.e., how the estimated daily dioxin dosage relates to the tolerable daily intake dosage) or establishing soil concentrations that do not pose an unacceptable risk. An analysis of uncertainties that affect the level of confidence inherent in these risk estimates will be provided.

G. Ecological Risk Assessment

Dow will consult with MDEQ regarding the need for an Ecological Risk Assessment for the Midland Area Soils study area.

H. Data Analysis

Dow will analyze the investigation data outlined in this Task and prepare a report. The objective of the data analysis section is to summarize the results of the data collected and analyze the data for the RI and its report. The analysis will also ensure data quality assurance procedures have been followed.

TASK V: REPORTS

Draft and final reports will be prepared to present the results of Tasks I through IV. These reports will be submitted in accordance with the schedule contained in the License and the RI Workplan, upon its approval:

A. Interim Response Actions (Task I)

B. Description of Current Conditions (Task II)

C. RI Workplan (Task III)

D. RI Report (Task IV)

TASK VI: PUBLIC PARTICIPATION PLAN

It is anticipated that the following types and means of communication with the public will occur during the process outlined above. The specific actions taken will be based, in part, on the level of community interest in various tasks and what is needed to keep the public apprised of significant developments in the RI process:

A. Fact Sheets. Dow will prepare Fact Sheets to be reviewed and approved by MDEQ that will address key topics and milestones of interest to the community (e.g. the Corrective Action process, IRAs, the RI Workplan, RI Findings, etc.). These Fact Sheets will be made available in the document repository and on the Dow website.

B. Mailing List. Dow will prepare and maintain a mailing list that can be used by Dow and the MDEQ to facilitate communication of events and information related to the RI process.

C. Community Information Center.

1. Paper Document Collection. Dow will secure and maintain a location within Midland where the public can review copies of the relevant documents.

2. Website. Dow will maintain a website that will include copies of the paper documents maintained in the paper document repository.

D. Public Meetings. Dow will arrange for Public Meetings to be held in Midland in places and at times convenient to the public. Small-group or one-on-one meetings will be held as necessary or appropriate to discuss concerns. Larger, multi-party meetings or "town meetings" will be held when that is the appropriate format. Dow will coordinate the scheduling and planning of Public Meetings with MDEQ.

1. Public Meetings will be scheduled in conjunction with the initial submission and following approval of Dow's written submissions of Workplans and significant reports.

2. Public Meetings will be schedule in coordination with any License modification activities.

PROPOSED SCHEDULE OF TASKS

Tasks	**Timing**
I. Interim Response Actions	
A. Community Information Center	Immediate implementation pursuant to the workplan schedule following DEQ approval of the IRA workplan
B. Public Information Materials	Immediate implementation pursuant to the workplan schedule following DEQ approval of the IRA workplan

II. Description of Current Conditions

A workplan for the Current Conditions Report will be submitted to DEQ for approval 45 days after the approval of the SOW.

The Current Conditions Report will be submitted 180 days following approval of the Current Conditions Report workplan.

III. RI Work Plan Requirements

The Project Management Plan, Data Collection Quality Assurance Project Plan and Data Management Plan will be submitted within 90 days of the DEQ approval of the SOW.

IV. Remedial Investigation

The RI Work Plan will be submitted 60 days after the approval of the Current Conditions Report.

SCHEDULE OF SUBMISSIONS

Dow Submission	**Due Date/Task Commencement Timing***
Task II Current Conditions Report	180 days after MDEQ approval of Workplan
RI Workplan	60 days after MDEQ approval of Current Conditions Report
IRA workplan	60 days after MDEQ approval of IRA
IRA Implementation	Upon MDEQ approval of IRA workplan
Implementation of RI	Upon MDEQ approval of RI Workplan
RI Report	60 days following completion of RI

*Dow will apply for any necessary permits or seek access to private property upon the approval of the applicable Workplan.